

A list of the leech (Clitellata: Hirudinida) collection deposited in the Department of Zoology, The University Museum, The University of Tokyo.

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Introduction

The leech collection deposited in the Department of Zoology, The University Museum, The University of Tokyo (UMUTZ) consists of 27 bottles referable to 14 species of 8 families and two unidentifiable species. These specimens were collected between 1883 and 1910 from Japan, Taiwan, and China. There are several specimens of which the collected date or locality were not written on the labels. The collection includes the type series of *Orobdella whitmani* Oka, 1895 as noted below.

There were three zoologists who studied about leeches at the University of Tokyo, formerly known as Tokyo Imperial University. Therefore, most of the leech specimens housed in the UMUTZ were possibly collected by these three researchers.

Professor Charles O. Whitman studied Japanese leeches when he was employed as the second Professor of Zoology at the University of Tokyo in 1879–1881. He was the first researcher who studied the taxonomy of leeches in Japan, and described five leech species (Whitman, 1884, 1886); 1) *Hirudo nipponia* Whitman, 1886; 2) *Whitmania acranulata* (Whitman, 1886); 3) *Whitmania pigra* (Whitman, 1884); 4) *Whitmania edentula* (Whitman, 1886); and 5) *Haemadipsa japonica* Whitman, 1886.

Professor Isao Ijima, known as the second Japanese Professor of Zoology at the Tokyo Imperial University and a famous parasitologist, studied hirudinology under Professor Whitman. He reported oogenesis of the *Nepheleis* species collected in Tokyo (Ijima, 1882).

Dr. Asajiro Oka studied leeches after Whitman left Japan. He was the first Japanese researcher to study leech taxonomy and described 33 leech species during 1895–1935 (Sket and Trontelj, 2008). In 1895, when he was a professor at the Yamaguchi Higher School (Oka, 1895a; Zoological Society of Japan, 1938), he established the genus *Orobdella* and described three new species, *Orobdella ijimai* Oka, 1895, *Orobdella octonaria* Oka, 1895 and *O. whitmani*, based on specimens stored in the Museum of the Zoological Institution of the University of Tokyo. He described the other 30 species between 1902 and 1935, when he was a professor at the Tokyo Higher Normal School (now Tsukuba University). Most of his leech specimens were deposited at Tsukuba University, and later the collection was transferred to and stored at the National Museum of Nature and Science, Tokyo (NSMT) (Richardson, 1971; Nakano, 2010).

The type series in the UMUTZ

As mentioned above, there is a possibility that the type series of the following eight species could be included in the leech collection of the UMUTZ: 1) *Haemadipsa japonica*; 2) *Hirudo nipponia*; 3) *Whitmania acranulata*; 4) *Whitmania edentula*; 5) *Whitmania pigra*; 6) *Orobdella ijimai*; 7) *Orobdella octonaria*; and 8) *Orobdella whitmani*. The former five species were described by Whitman (1884, 1886), and the latter three species by Oka (1895).

Only the type series of *O. whitmani* remains in the UMUTZ collection. There are eight individuals in the bottle labeled as ‘type specimen’ of *O. whitmani*. The type series has been examined by Nakano (2010) with the lectotypification, since *O. whitmani* was described without its type designation (Oka, 1895a).

The other specimen, UMUTZ-Ann-Hir-29, is also labeled as “type specimen” of *O. whitmani*. In addition, “Nikko” and “Nakagawa” are also written on the original label. In the original description of *O. whitmani*, this species was not described based on the materials collected from Nikko (Oka, 1895a). On the other hand, *Orbdella ijimai* was established based on the specimens collected from Nikko by Nakagawa (Oka, 1895a). Therefore, there is a possibility that this specimen would be the syntype of *O. ijimai*. However, re-identification of this specimen is impossible since the specimen in the bottle has been melted. The status of this specimen thus remains uncertain.

Orobdella octonaria was originally described by Oka (1895a) based on the materials deposited at the University of Tokyo. However, the type series could not be found in the collection. One of the type series of *O. octonaria*, collected from Hakone, Kanagawa Pref., Japan, was discovered from the collection at the NSMT (Nakano, unpublished data). The collection including the syntype was transferred from Tsukuba University to the NSMT as noted above.

The type series of the following six species are still missing: 1) *Haemadipsa japonica*; 2) *Hirudo nipponia*; 3) *Whitmania acranulata*; 4) *Whitmania edentula*; 5) *Whitmania pigra*; and 6) *Orobdella ijimai*. However, there is no need to designate neotypes for the six species because their identities are not doubtful.

Statuses of the type series of the eight species, which should be deposited in the UMUTZ, are as follows:

Haemadipsa japonica Whitman, 1886: missing.

Hirudo nipponia Whitman, 1886: missing.

Whitmania acranulata Whitman, 1886: missing.

Whitmania edentula Whitman, 1886: missing.

Whitmania pigra Whitman, 1884: missing.

Orobdella ijimai Oka, 1895: missing (? syntype, UMUTZ-Ann-Hir-29).

Orobdella whitmani Oka, 1895: lectotype, UMUTZ-Ann-Hir-5-1; paralectotypes, UMUTZ-Ann-Hir-5-2–8.

Orobdella octonaria: syntype deposited at the NSMT.

The other noteworthy specimens in the UMUTZ

With the exception of the type series of *O. whitmani*, few notable materials are included in the collection of the UMUTZ. These three specimens are as follows. For more details, see the Remarks section of each specimen.

- 1) UMUTZ-Ann-Hir-1 *Ozobranchus branchiatus* (Menzies, 1791): described in Oka (1895b).
- 2) UMUTZ-Ann-Hir-3 *Limnotrachelobdella okae* (Moore, 1924): *Tribolodon hakonensis* (Günther, 1880), a new host record for this species.
- 3) UMUTZ-Ann-Hir-10 *Erpobdella japonica* (Pawłowski, 1962): indicating the possibility that the *Nepheleis* sp. in Ijima (1882) would be *E. japonica*.

List of the leech collection deposited in UMUTZ

The specimens are listed basically according to the system in Sawyer (1986), taking into account the revisions in Phillips and Siddall (2009) and Ocegüera-Figueroa et al. (2011).

Order Rhynchobdellida Blanchard, 1894

Family Glossiphoniidae Vaillant, 1890

Glossiphonia complanata (Linnaeus, 1758)

UMUTZ-Ann-Hir-24; Number of specimens: 2

Locality: Leipzig, Germany

Date: 1884

Collector: Isao Ijima

Label information: 290; *Clepsine complanata* Sav.; Rhynchobdella, Hirudinea; Leipzig; 1884; Prof. 飯島

Family Piscicolidae Johnston, 1865

Limnotrachelobdella okae (Moore, 1924)

UMUTZ-Ann-Hir-2; Number of specimens: 1

Locality: Tokyo, Japan

Date: Unknown

Collector: Unknown

Label information: *Trachelobdella sinensis*; Tokyo; shark

Remarks: There was “shark” written on the original label. However, elasmobranchs have never been reported as hosts for *L. okae*. Besides, papers that noted this specimen were not found. Therefore, it is impossible to make a reassessment that the term “shark” indicates the host for *L. okae*.

UMUTZ-Ann-Hir-3; Number of specimens: 8

Locality: Tokyo, Japan

Date: 1884

Collector: Unknown

Host: *Tribolodon hakonensis* (Günther, 1880) (Actinopterygii: Cypriniformes: Cyprinidae)

Label information: *Callobdella*; On fins of Ugoi; Tokyo, 1884

Remarks: Ugoi is a vernacular name which indicates a Japanese dace, *T. hakonensis*, in Tokyo (Ichthyological Society of Japan, 1981). Nagasawa et al. (2009) noted that only Pacific redbfin, *Tribolodon brandti* (Dybowski, 1872), was a host for *L. okae* in the family Cyprinidae. Accordingly, *Tribolodon hakonensis* is a new host for *L. okae*.

Stibarobdella moorei (Oka, 1910)

UMUTZ-Ann-Hir-4; Number of specimens: 1

Locality: Unknown

Date: Unknown

Collector: Unknown

Label information: None

UMUTZ-Ann-Hir-26; Number of specimens: 1

Locality: Unknown

Date: Unknown

Collector: Unknown

Label information: Separated from '34.9.19~22 521 E' in the can no. '51409-51459'

UMUTZ-Ann-Hir-27; Number of specimens: 1

Locality: Misaki, Japan

Date: July 25, 1907

Collector: Iizuka

Label information: B2; Misaki; 明治 40 年 7 月 25 日; Iizuka

Piscicolidae gen. sp.

UMUTZ-Ann-Hir-22; Number of specimens: 1

Locality: Unknown

Date: Unknown

Collector: Miyake

Label information: 191; *Ichthyobdella* ?; [unreadable sentence in English]; from Dr.

Miyake

Remarks: Dried up. Re-identification impossible.

Family Ozobranchidae Pinto, 1921

Ozobranchus branchiatus (Menzies, 1791)

UMUTZ-Ann-Hir-1; Number of specimens: 2

Locality: Ogasawara Islands, Japan

Date: Unknown

Collector: Sadamori Hirota

Host: *Chelonia mydas* (Linnaeus, 1758) (Reptilia: Testudines: Cheloniidae)

Label information: 208; *Ozobranchus menoeisi* Qutr.; Rhynchobdella, Hirudinea

Remarks: Described in Oka (1895b).

Order Arhynchobdellida Blanchard, 1894

Suborder Hirudiniformes Caballero, 1952

Family Hirudinidae Whitman, 1886

Hirudinaria manillensis (Lesson, 1842)

UMUTZ-Ann-Hir-7; Number of specimens: 7

Locality: Mt. Teraso, Kosyun, Taiwan

Date: July 30, 1899

Collector: Unknown

Label information: 産地 テラソ; 明治 32 年 7 月 30 日

Hirudo nipponia Whitman, 1886

UMUTZ-Ann-Hir-9; Number of specimens: 1

Locality: Tokyo, Japan

Date: Unknown

Collector: Unknown

Label information: 211; *Hirudo nipponica* Whit.; Gnathobdella, Hirudinea; Tokyo

UMUTZ-Ann-Hir-28; Number of specimens: Unknown

Locality: Tokyo, Japan

Date: Unknown

Collector: Unknown

Label information: *Hirudo nipponia* Whitm.; Tokio

Remarks: Dried up. Re-identification impossible.

Whitmania edentula (Whitman, 1886)

UMUTZ-Ann-Hir-12; Number of specimens: 1

Locality: Maebashi, Gunma Pref., Japan

Date: Unknown

Collector: Isao Ijima

Label information: *Leptostoma edentulum* Whitm; Mayebashi; (Ijima)

UMUTZ-Ann-Hir-14; Number of specimens: 7

Locality: Tokyo, Japan

Date: Unknown
Collector: Unknown
Label information: *Leptostoma edentulum* Whitm.; Tokyo

Whitmania pigra (Whitman, 1884)

UMUTZ-Ann-Hir-6; Number of specimens: 2

Locality: China
Date: Unknown
Collector: Kuwano
Label information: 清国ニテ 栗野氏採集

Family Haemadipsidae Blanchard, 1893

Haemadipsa japonica Whitman, 1886

UMUTZ-Ann-Hir-8; Number of specimens: 1

Locality: Mt. Hikosan, Fukuoka Pref. and Oita Pref., Japan
Date: Unknown
Collector: Unknown
Label information: 216; *Haemadipsa japonica* Whit.; Gnathobdella, Hirudinea; 彦山, 豊前

UMUTZ-Ann-Hir-16; Number of specimens: 6

Locality: Kinkasan Island, Miyagi Pref., Japan
Date: July 30, 1899
Collector: Unknown
Label information: 金華山; ヒル; 明治 32 年 7 月 30 日

UMUTZ-Ann-Hir-17; Number of specimens: 2

Locality: Mt. Hikosan, Fukuoka Pref. and Oita Pref., Japan
Date: 1889
Collector: Unknown
Label information: 175; 山ビル; *Haemadipsa japonica* Whit.; Hiko-san, Buzen; 1889
Remarks: Dried up. Re-identification impossible.

Haemadipsa rjukjuana Oka, 1910

UMUTZ-Ann-Hir-11; Number of specimens: 1

Locality: Beishan, Guoshing Township, Nantou Co., Taiwan
Date: April 16, 1910
Collector: Unknown
Label information: 北山坑庄; 明治 43 年 4 月 16 日

Suborder Erpobdelliformes Sawyer, 1986

Family Erpobdellidae Blanchard, 1894

Erpobdella japonica (Pawłowski, 1962)

UMUTZ-Ann-Hir-10; Number of specimens: 2

Locality: Tokyo, Japan

Date: Unknown

Collector: Unknown

Label information: *Nepheles*; Tokyo

Remarks: Ijima (1882) described oogenesis of *Nepheles* sp. He noted that the material had been collected in Tokyo. In accordance with the label information, therefore, there is a possibility that the leech species in Ijima (1882) would be *Erpobdella japonica*.

UMUTZ-Ann-Hir-25-1; Number of specimens: 8

Locality: Tokyo, Japan

Date: Unknown

Collector: Unknown

Label information: Tokyo

Remarks: UMUTZ-Ann-Hir-25 was divided into two bottles (25-1 and 25-2) because two different species had been in the same bottle.

Family Gastrostomobdellidae Richardson, 1971

Orobdella octonaria Oka, 1895

UMUTZ-Ann-Hir-23; Number of specimens: Unknown

Locality: Mt. Arafuneyama, Saku, Nagano Pref., Japan

Date: August 30, 1903

Collector: Umitaro Koyama

Label information: 産地 長野県南佐久郡荒船山山中ニテ捕; 明治 36 年 8 月 30 日; 小山海太郎氏

Remarks: Melted. Re-identification impossible.

Orobdella whitmani Oka, 1895

UMUTZ-Ann-Hir-5; Number of specimens: 8

Locality: Mt. Kinkazan, Gifu, Gifu Pref., Japan

Date: Unknown

Collector: Yasushi Nawa

Label information: *Orobdella whitmanii* Oka; Type specimen; Gifu; Nawa

Remarks: Lectotype, UMUTZ-Ann-Hir-5-1; paralectotypes, UMUTZ-Ann-Hir-5-2–8 (Nakano, 2010).

UMUTZ-Ann-Hir-29; Number of specimens: Unknown

Locality: Nikko, Tochigi Pref., Japan

Date: Unknown

Collector: Nakagawa

Label information: *Orobdella whitmnai* Oka; Type sp; Nikko; Nakagawa

Remarks: Melted. Re-identification impossible. This specimen would be the syntype of *Orobdella ijimai*.

Salifidae Johansson, 1910

Odontobdella blanchardi (Oka, 1910)

UMUTZ-Ann-Hir-13; Number of specimens: 2

Locality: Fukui Pref., Japan

Date: Unknown

Collector: Unknown

Label information: *Trocheta*; Echigo

UMUTZ-Ann-Hir-15; Number of specimens: 1

Locality: Takayama, Gifu Pref., Japan

Date: Unknown

Collector: Unknown

Label information: 212; *Nephelis vulgaris* Moy. T.; Gnathobdella; Hirudinea; 高山, 飛騨

UMUTZ-Ann-Hir-25-2; Number of specimens: 2

Locality: Tokyo, Japan

Date: Unknown

Collector: Unknown

Label information: Tokyo

Remarks: See Remarks of UMUTZ-Ann-Hir-25-1

Erpobdelliformes fam. gen. sp.

UMUTZ-Ann-Hir-21; Number of specimens: 5

Locality: Unknown

Date: 1884

Collector: Isao Ijima

Label information: 119; *Nephelis*; [unreadable sentence]; 1884; (Ijima)

Remarks: Dried up. Re-identification impossible.

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References

- Ichthyological Society of Japan (ed). 1981. Dictionary of Japanese Fish Names and Their Foreign Equivalents, Sanseido, Tokyo, 834 pp.
- Ijima, I. 1882. On the origin and growth of the egg and egg-strings in *Nephelis*, with some observations on the "spiral asters". Q. J. Microsc. Sci. N. S., 22:189–211.
- Nagasawa, K., Izumikawa, K., Yamanoi, H. and Umino, T. 2009. New hosts, including marine fishes cultured in Japan, of *Limnotrachelobdella okae* (Hirudinida: Piscicolidae). Comp. Parasitol., 76:127–129.
- Nakano, T. 2010. A new species of the genus *Orobdella* (Hirudinida: Arhynchobdellida: Gastrostomobdellidae) from Kumamoto, Japan, and a redescription of *O. whitmani* with the designation of the lectotype. Zoo. Sci., 27:880–887.
- Oceguera-Figueroa, A., Phillips, A. J., Pacheco-Chaves, B., Reeves, W. K. and Siddall, M. E. 2011. Phylogeny of macrophagous leeches (Hirudinea, Clitellata) based on molecular data and evaluation of the barcoding locus. Zool. Scr., 40:194–203.
- Oka, A. 1895a. On some new Japanese land leeches. (*Orobdella* nov. gen.). J. Coll. Sci. Imp. Univ. Jpn., 8:275–306.
- Oka, A. 1895b. Description d'une espèce d'*Ozobranthus* (?*Oz. Mendiesi* Quatr.). Doubutsugaku Zasshi, 7:1–7.
- Phillips, A. J. and Siddall, M. E. 2009. Poly-paraphyly of Hirudinidae: many lineages of medicinal leeches. BMC Evol. Biol., 9:246.
- Richardson, L. R. 1971. Gastrostomobdellidae f. nov. and a new genus for the gastroporous *Orobdella octonaria* Oka, 1895, of Japan (Hirudinoidea: Arhynchobdellae). Bull. Natl. Sci. Mus., 14:585–602.
- Sawyer, R. T. 1986. Leech Biology and Behaviour, Clarendon Press, Oxford, 1065 pp.
- Sket, B. and Trontelj, P. 2008. Global diversity of leeches (Hirudinea) in freshwater. Hydrobiologia, 595:129–137.
- Whitman, C. O. 1884. The external morphology of the leech. Proc. Am. Acad. Arts Sci., 20:76–87.
- Whitman, C. O. 1886. The leeches of Japan. Q. J. Microsc. Sci. N. S., 26:317–416.
- Zoological Society of Japan. 1938. Bibliography of Asajiro Oka and his photograph. Annot. Zool. Jpn., 17:197–198.

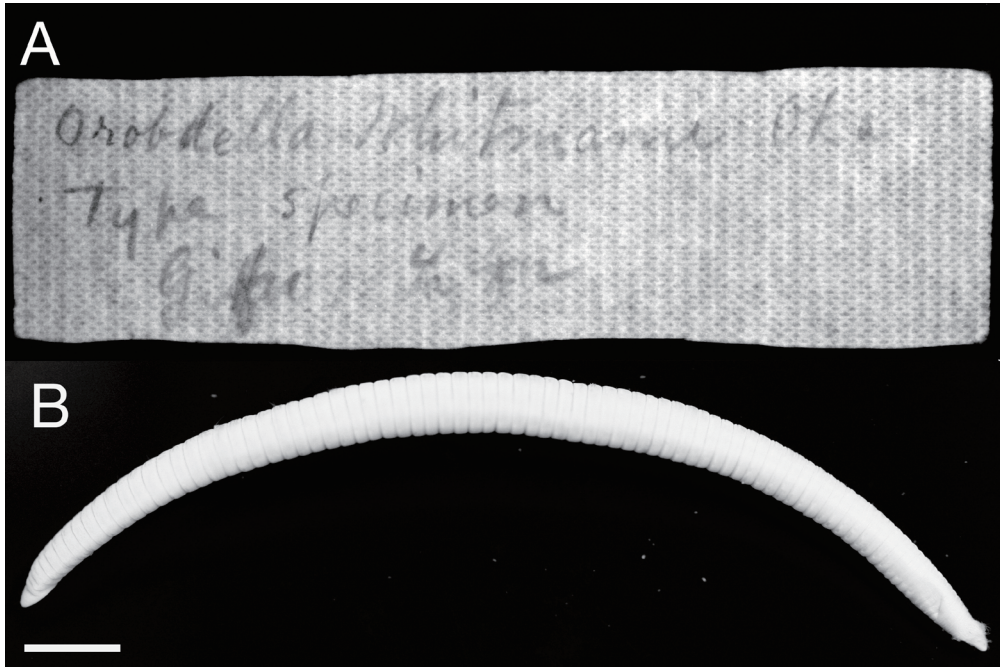


Fig. 1. *Orobdella whitmani* Oka, 1895, lectotype, UMUTZ-Ann-Hir-5-1. A) Label; B) lateral view. Scale bar, 5mm.